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REVIEW OF PROGRESS ON WATER-RELATED ISSUES: CONSIDERATION OF INSTITUTIONAL AND LEGAL ISSUES IN WATER RESOURCES MANAGEMENT

Institutional and legal issues relevant to the implementation of water markets

Report of the Secretary-General

SUMMARY

Modern water legislation is concerned with improving water allocation, for which water marketing is an important tool. In a number of countries, legal provisions that do not allow markets to play a role in the allocation of water resources have resulted in economic rigidity and inefficient water allocations.

Some authorities have indicated that it may be necessary to regulate water marketing in order to limit undesirable environmental and social effects. As a result, mature water marketing systems have developed principles and regulations that aim to strike a balance between market forces and social and environmental concerns.

The most important such principle states that the existence and valid transfer of water rights must be subject to the effective and beneficial use of the waters to be transferred. The purpose of this principle - a sine qua non for the existence of a valid water right, and therefore of public interest - is to prevent monopolies and speculation based on the hoarding and

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accumulation of unused water entitlements, and it is generally known as the use or lose principle.

With the privatization of large-scale public services, the importance of the use or lose principle becomes immediately apparent: without it, water rights can be used to block entry into service markets, thus restricting competition and allowing purveyors to obtain monopolistic rents. Water - and the rights attached to it - may then become part of the powerful market policies and strategies of individual firms; the present report provides a number of examples of this phenomenon.

Other conditions and regulations are applied to water marketing to prevent negative transactional impacts on other users, special groups, communities, society at large and the environment. Thus, mature water marketing systems have developed rules on, for example, the amounts of water to be transferred; the protection of the area of origin; environmental impacts; community interests, priorities and preferences; and the water rights of indigenous citizens.

Water rights marketing is also affected by other legal, administrative, economic and investment-related factors, including the quality of the right to be marketed; the size of the transaction; the profile of the parties involved; the reliability of records and registries; the availability of appropriate infrastructure; and the location of the water resources.

Thus, although water markets improve the efficiency of water allocations, water legislation must allow water reallocations - subject to environmental and social concerns - wherever market failures are common. The present report reviews legal systems that allow water marketing, and provides examples of regulations that are intended to cope with externalities and other concerns of a number of countries. The report is a technical assessment and makes no value judgements.

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INTRODUCTION

1. In previous reports to the Committee on Natural Resources, a wide range of issues related to water legislation and institutional arrangements for water management have been addressed. In the present report, attention is focused on the structure and conditionalities of water rights and water markets.

2. Subjects have been selected according to their relevance under present water legislation. In virtually every region in which the United Nations operates, new relationships between the structure of water rights and water investment and conservation are emerging. At the same time, there is an increasing tendency to facilitate and expedite water reallocations according to efficiency and demand, a process that is often considered to be best implemented through water markets, in which water rights are freely transacted and traded.

3. One of the Guiding Principles contained in the Dublin Statement adopted at the International Conference on Water and the Environment (Dublin, 26-31 January 1992) is that fresh water is a finite and vulnerable resource, essential to sustain life, development and the environment (A/CONF.151/PC/112, annex, Principle No. 1). Since water sustains life, the effective management of water resources requires a holistic approach that links social and economic development with the protection of natural ecosystems. Another Principle adopted at the Conference recognizes that water has an economic value in all its competing uses and should be recognized as an economic good (A/CONF.151/PC/112, annex, Principle No. 4). In accordance with this Principle, it is vital to recognize first and foremost the basic right of all human beings to have access to clean water and sanitation at an affordable price. Access to water is in fact so closely associated with basic human rights that most water legislation confers the highest allocational priority to the supply of water for drinking and sanitation purposes. The failure to recognize the economic value of water has led in the past to wasteful and environmentally damaging uses of water. Managing water as an economic good is an important way of achieving efficient and equitable use and of encouraging the conservation and protection of water resources.

4. As both a social and economic good, water is obviously highly sensitive to environmental, economic and social processes, so that the introduction of systems of water rights and markets is not neutral to social needs, monopolies and appropriate water management.

5. The present report reviews developments in water legislation, including examples from a number of countries, with a special focus on the two subjects under study: the structure and conditionalities of water rights, and water markets. The report examines the results of alternative water rights systems, and submits tentative recommendations for consideration by the Committee.

6. The authors of the present report wish to acknowledge the countries and representatives that submitted information for consideration for the report; examples from Australia, Benin, China, India, Pakistan and Zimbabwe are before the Committee.

7. While examples from several other countries are covered in the report, the cases of the United States of America, Chile and Peru are discussed in some detail. The United States is considered in detail because it probably has the longest and best recorded experience in water marketing; its developments, findings, search for balance between public and private interests, and regulations are worth taking into account for the purpose of drafting legislation on the subject. Chile and Peru are discussed in some detail because they embody a laissez-faire philosophy on water management; their experience is also worth considering.

I. MODERN WATER LEGISLATION

8. Modern legislation has considerably broadened the type and scope of issues to be considered in the regulation of water resources.

9. There is a concern to improve water allocation through water marketing. Some authorities, however, have indicated that marketing must be regulated to prevent unwanted environmental and social effects. It has also been observed that the performance of water markets is dependent on contingent circumstances.

10. While water legislation and water management are influenced by the need to improve the economic efficiency of water allocation and use, processes for improving water allocation take place within environmental and social frameworks in which market failures and externalities are common. This is best exemplified by two contemporary trends in water management: the development of water markets and the opposing need for water planning and control of externalities. Since both trends serve important functions, economic flexibility may require accommodation with both the environmental requirements and the social concerns posed by sustainable development.

II. STRUCTURAL AND REGULATORY NORMS IN WATER LEGISLATION

11. Because water is an ephemeral and scarce resource, and is also susceptible to negative externalities, proper management of both water and water-related activities is crucial for implementing successful and sustainable processes of water development and conservation. 1/

12. However, the role of institutional and legal arrangements is not limited to water management and the regulation of water-related activities. The legal-institutional design determines the framework within which the private sector is prompted to invest in water development and conservation; it therefore performs a structural function of socio-economic development, determining the manner in which economic agents relate to economic resources (see E/C.7/1993/2).

13. This function of the law has great relevance to conservation and development goals: depending on its operation, economic agents are prompted to invest in water development and conservation of their own free will and on a regular basis, if economically beneficial. 2/ Security and flexibility of rights are two main structural features of legislation in general and water law in particular.

A. Main structural elements

14. The structural elements of water legislation primarily concern the ownership of water resources, the legal nature and stability of rights to water, the effective and beneficial use of water, the transferability of water rights, and the acknowledgement and respect of uses and customary entitlements when initiating formal water legislation or other legal changes.

1. Ownership of water resources

15. Most systems of water law explicitly include water within the public domain of the State, the people or the nation. This concept has traditionally been expressed by legislation stating that water belongs to the public domain, a terminology based on the notion that the nature of water resources and their importance to the economy and social well-being do not allow private ownership of water as a resource. 3/

16. This terminology, however, is not always used. A draft water law for Peru replaces the traditional term "public domain" with the term "national patrimony". Concerning the meaning of such terminology within the context of the French Water Law of 1992, Gazzaniga states that the use of the term "national common patrimony" does not effectively change the legal regime of the water resources of the country. Peruvian authorities argue that the draft law proposed for Peru would in fact separate water from the public domain. 4/

17. It is apparent that the term "national patrimony" does not have the same precise legal meaning as "public domain". If the intent is to include water within the public domain of any given country, it is advisable to use the traditional terminology; otherwise, an element of uncertainty would be introduced in new legislation. In India, water is considered a "national asset". 5/

2. Water rights

18. The issue of uncertainty raised above becomes particularly relevant when creating a system of water rights.

19. Although in most countries water - or at least the most important water sources - belongs to the public domain, water rights granted to private individuals or corporations are protected under the property provisions of national and (in the case of federal countries) state or provincial constitutions.

20. Thus, the stability of water rights is an important principle in water law, which some authorities have traced back to Roman law. 6/ Constraints to granting stable water rights negatively affect development. Thus, in Zimbabwe difficulties in acquiring reliable water rights are a main constraint to new viable agricultural investment. 7/

21. A system of stable water rights is an incentive to invest in the development and conservation of water resources. Stable water rights are useful collaterals, assets or appurtenances for credit purposes, and are also important assets when assessing properties for taxation. In addition, the stability and certainty of water rights and appurtenant uses provide recognition to existing economies, and prevent the social unrest that would result from ignoring existing uses when enacting changes in water legislation. 8/

22. A water right is usually a right to use, and ownership of a water right normally means a usufructuary power, not ownership of the body of water itself. In some legislation, usufructuary power can be traded.

23. The need to establish comprehensive systems of water allocation that separate land and water titles, with specific references to the attributes of entitlements, have been specifically endorsed by the Council of Australian Governments. 9/

3. Effective and beneficial use

24. The relevance of water rights as a property asset is related to the availability of the resource: the scarcest resource is the most valuable. Therefore, most water laws have provisions that require the effective use of water entitlements, either for a right to be obtained and kept or for the maintenance of a valid water right.

25. The principle of effective and beneficial use is widespread. While the terminology is not uniform, the notion that water rights risk forfeiture if not used or if not used according to the terms of a licence or permit is found in the German Law, as amended on 23 September 1986, the Spanish Law of 1985, the new Mexican Water Law, the legislation of most Argentine provinces, and the laws of the western states of the United States of America. The legislation of Zimbabwe specifically considers the economic aspects of applications for water rights. 7/

26. The rationale behind the principle has been precisely and clearly constructed by the authorities, judges and legislation of the United States. A typical statement of the rule of beneficial use is that beneficial use is the basis, measure and limit of all rights to the use of water in a given state, consistent with the interest of the public in the best utilization of water supplies. 10/

27. The tenets of the doctrine of effective and beneficial use are: (a) water is not to be obtained for speculation or let run to waste (reality of use); (b) the end use must be a generally recognized and socially acceptable use; (c) water is not to be misused (reasonable efficiency); (d) the use must be reasonable compared with other uses.

28. A common idea is that the quantity of water used should be no more than needed, the concern being with the possibility of vesting an absolute monopoly on a single individual. 10/ This anti-monopoly, anti-speculation concern, where claimants do not have a specific use in mind, continues today.

29. For a long time, it was difficult to assess what happened in practice when water legislation did not have a use requirement, since national systems of water legislation did not normally grant exclusive, non-riparian based water rights without adding the requirement of effective and beneficial use.

30. At present, the state of flux of water legislation in general and legislation related to water-based public services in particular has prompted specific research into the subject of water rights and the consequences of creating water rights that are severed from the requirement of effective and beneficial use. Fortunately, assessments of the Chilean experience, in which water rights are not conditional upon effective and beneficial use, are becoming widely available.

31. Natural resource economists argue that non-use, if not penalized with forfeiture, may result in so-called "sleeper rights", which increase uncertainty on the quantities of available waters. 1/

32. The experience of Chile in issuing unconditional water rights demonstrates the necessity of requiring effective and beneficial use. A study on the impact of the legal system on water allocation in Chile has found that it is common for State-owned monopolies that benefit from exclusive rights to be privatized with them, creating legal barriers to entry that maintain the monopolistic characteristics of the sector. The regulatory framework for electricity is based on the existence of competition in the generation of electricity. Competition, however, is practically non-existent in Chile. The water rights of major hydroelectrical projects belong mainly to a single corporation, so that the largest generator has an incentive to appraise projects in relation to the effects that they will have on the profitability of its intramarginal capacity. It can obtain the monopoly equilibrium over time by postponing investments. New entrepreneurs will be unable to enter the generation market because they do not have the water rights to undertake the more efficient projects. Water rights should have been returned to the State prior to privatization, which in turn could have granted them subject to the conditionality of their timely development through new projects to be undertaken by existing producers or newcomers. 11/

33. Thus, the current operation of the Chilean system appears to confirm the rationale behind the requirement of effective and beneficial use.

34. Monopolization through the creation of barriers to entry resulting from the control of essential production inputs and natural resources is a standard problem in economics. 12/ The existence of water markets does not alleviate the situation, since in fact crucial inputs of this kind are not usually traded on competitive markets. 13/

35. Furthermore, without the penalty of forfeiture for non-use, the incentives for large institutional users to sell water rights, are relatively small compared with the strategic advantages that control of a key production input represents within the market power policies of corporate practices.

36. In sum, it appears that the absence of a requirement of effective and beneficial use does have a negative effect on water transactions, water markets

and efficient water allocations. Empirical evidence on the current workings of water markets in Chile shows that with a few local exceptions market transactions of water rights in Chile have been limited. 14/

4. Water transfers

37. Water rights transfers are increasingly being considered as a policy alternative to encourage the optimal use of scarce water resources through private reallocation. They are also a means of postponing the development of costly new supplies. Water markets are a distinctive characteristic of water use in the western states of the United States of America. In other areas, water markets are a relatively new experience.

5. Recognition of existing uses

38. Legislative change creates stress for existing uses and water rights. Most legislation provides for the recognition of uses and rights already existing at the time of changes in the legal framework for water allocation and management. Such provisions recognize existing economies and prevent opposition to legal change. It is especially important to ensure that the procedural aspects of the process of acknowledging and recognizing existing uses do not affect the entitlements of rural and indigenous populations through difficult formalities and short forfeiture periods.

B. Main regulatory elements

39. Water legislation includes a number of regulatory norms, which usually address issues of allocation of water to environmental needs; water conservation; the protection of water supplies; the establishment of preferences and priorities; the protection of water quality; technological and efficiency requirements; the establishment of management areas; basin management principles; the monitoring of use; requirements for information; the administrative rights of entry and inspection; the creation and enforcement of public rights; emergency measures; and the registration and recording of uses and supplies and other regulatory measures.

40. One example of recent developments in the area of regulation is the policy of the Council of Australian Governments to allocate water to the environment as a legitimate water user. Allocations to uses other than environmental needs must take place only after it is established that environmental requirements are appropriately met. 9/ While the Council endorses the trading of water rights or entitlements, such trading must take place from the perspective of natural resources management, and must take into consideration social, physical and ecological sustainability.

41. Benin regulates and controls the use of groundwater as well as the waters and resources of river basins. 15/

42. Pakistan is currently planning the implementation of strict regulatory measures to prevent the intrusion of saline water into fresh groundwater. 16/

43. In a similar vein, the Water Policy of the Government of India requires that the exploitation of groundwater be regulated to match recharge, ensure social equity, prevent overexploitation, and integrate surface and groundwater management. 5/ In sections 13 to 18, the Policy also provides for water quality protection, zoning, conservation, flood control and management, drought management and protection against land erosion. Apparently, conjunctive water use is also part of the irrigation policy. 17/

44. India has also developed detailed principles for the consideration of ecological issues in the development of river valley projects, 18/ and in section 8 of its Water Policy, has determined that drinking water shall have a national priority in water allocation. Regulatory measures include the charging of a cess for water pollution; in the past, however, such cesses have been found to be too low and therefore inadequate. 19/

45. The Government of Zimbabwe plans to amend its national water legislation in order to enshrine a priority for urban water supply. The present system of time preferences is negatively affecting the well-being of urban populations, since no priority is recognized for any specific use. Zimbabwe also provides for water pollution control and for the creation of public water control areas. The overall philosophy of the country is to manage and regulate water resources in accordance with the principles of social equity, the holistic integration of surface and underground waters, and resource sustainability. 7/ In addition, in 1994 India enacted an environmental impact assessment policy with a view to ensuring sound environmental management.

III. WATER MARKETS

46. The marketing of water rights is attracting increased attention as a useful and economically efficient alternative for the improvement of water allocations. As supplies diminish relative to demand, markets become not only an efficient alternative but also a necessary solution to the problems of water scarcity. Such countries as China, however, while acknowledging the need to develop water markets, emphasize the need to macromanage water resources so as to avoid harmful impacts on the environment and social development. 20/

A. The United States experience

47. Water markets are an important feature of the legal system of the western states of the United States of America. A review of their experience is important to the understanding of the subject and its complexities.

48. In Colorado, Nevada and Utah, water rights can be bought and sold separately from land. In other states, such as Arizona, water is acquired as an appurtenance to land. The reallocation of water rights may be - with the possible exception of water quality - the most pressing problem facing the arid west. 14/

49. For reallocation to be legally valid, the following requirements must be fulfilled:

(a) Water must have been beneficially used, and must continue to be beneficially used after the reallocation;

(b) Such reallocation must not affect other users and must be in the public interest;

(c) In many jurisdictions, interbasin transfers or transfers outside the area of origin can take place only after due consideration has been given to local interests;

(d) In some jurisdictions, appurtenance statutes prevent water reallocation. 14/

50. The marketing of water rights is a complex process, which is affected and influenced by several factors, including:

(a) Priority of the transacted right;

(b) Profile of the parties;

(c) Geographic flexibility;

(d) Size and economic value of the transaction;

(e) Reliability of the marketed water right;

(f) Buyer characteristics;

(g) Volume of water transferred;

(h) Changes in regional economies;

(i) System of water administration;

(j) Availability of infrastructure to effect a change;

(k) Environmental impacts. 21/

51. While water rights markets are strongly advocated by reputable experts, conflicts over water transfers are occurring in the western states of the United States of America, as large metropolitan areas seek water supplies in rural areas. The public values at stake include the economic development of urban areas, culture, way of life, environment and the future of rural communities built around agricultural uses. It is becoming increasingly apparent that current behaviour oriented around water law and the water market is incapable of solving this conflict in an equitable manner. Therefore, according to some authorities, oversight and regulatory approval for water transfers and markets are required. 22/

B. Regulation of water markets in the American system 23/

52. One result of the complexities of water marketing is that the activity has been subjected to regulations in the interest of third parties and the public. Broadly stated, regulations impinging on the marketing process include:

(a) The appurtenancy principle, which prohibits the transfer of water rights except as an appurtenance to the land where they are used. Its purpose was to prevent land speculation;

(b) Transfers to be approved by judicial, legislative or administrative authorities (the approving authority varies according to the law of each state);

(c) Public notice of the intent to transfer, granting the possibility of filing protests to either any interested person or only to holders of water rights (again, standing to oppose varies according to the legislation of each state);

(d) Administrative recording of the transfer and filing with the authority for water management;

(e) Issue of permits to reallocate and use subject to existing or new conditions, including proof of completion of work and beneficial use;

(f) Forfeiture of water rights (in some states, charges for misdemeanour as well) if prior approval is not obtained;

(g) Limitation of transferable entitlement to historic consumptive use;

(h) The requirement that transfer not injure other appropriators, who - even if junior - have a right to the substantial maintenance of the stream conditions existing at the time of their appropriations. Such injury may result from changes in volume, timing, storage, means of diversion, quality, deprivation of return flows or point of diversion, or a combination thereof;

(i) The accommodation of uses through conditions intended to mitigate or prevent injury;

(j) Compensation and the payment of expenses.

53. In addition to the above-mentioned regulatory examples, there are also considerations of public interest that apply to the review of applications to transfer water rights. They apply to the review of public value externalities, and may include the effects of economic activity resulting from the application; effects on fish and game resources and public recreation; effects on public health; opportunity cost of the use; harm caused to other persons; intent and ability to use water rights; effects on access to public and navigable waters; the need for water conservation; and factors of local relevance.

54. Accordingly, a reallocation would not be allowed if it resulted in the violation of minimum health, environmental or safety standards. However, the

public interest element can be accommodated by stipulating a requirement for reallocation to include measures to mitigate public interest concerns.

55. While there is no question of the substantive legitimacy of public interest concerns, there is some question about what the appropriate forums and means for their consideration may be. While there is always an administrative and judicial role, some authorities feel that such means and forums should include water planning and public participation.

56. Additional considerations may include the assessment of the impacts that a transfer may have on the environment, tax base or local economy of the area of origin of the water allocation to be transferred.

C. Latin America: Chile and the draft water law for Peru

57. Water marketing in Latin American countries is still incipient. In many cases, the appurtenance principle inherited from Spanish law and a strong tradition of strict administrative controls are still adhered to. In some areas, such as western Argentina, the appurtenancy principle, in association with other factors such as subsidies unrelated to effective demand for produce and pre-emption of some activities from the private sector, has made a noticeable contribution to the stagnation and even regression of regional economies.

58. However, there are some regional experiences of water marketing worth discussing.

59. Some laws, such as the Chilean Law of 1981 (arts. 6 and 21), authorize water transfers and marketing of water rights. Marketing of water rights is also endorsed in articles 26 to 29 of a draft water law prepared for Peru.

60. Neither the Water Law of Chile nor the draft water law for Peru reflect the public interest considerations or the detailed elaboration of rules to prevent injury to third parties that have characterized American Water Law. As has already been discussed, none of these require the effective and beneficial use of waters, a fact that has caused Chile to favour the formation of monopolies of water rights and hydroelectric generation.

61. In addition, some concepts, such as historical consumptive use, have not been elaborated either by the Law of Chile or the draft proposal for Peru. Consumptive water rights may allow the diversion and eventual transfer of the full nominal entitlement of a water right and not merely the amount historically consumed, as is the case in the western United States.

62. There has already been a case in Chile in which water rights originally used for agriculture have been transferred to mining, which has understandably increased the stress on the water source. Mining is a continuous activity, while agriculture is mostly seasonal: as a result, water abstractions have increased, without the change in use and ownership having been considered a relevant factor or a condition of the water transfer. 24/

63. In both the Chilean Law and the Peruvian draft law, the role of water administration and planning in assessing public interest elements when dealing with water transfers have been severely limited. The assumption is that market forces will deal with externalities and issues of public interest better than government organizations, whose role should be as limited as possible. The Chilean water market system is being promoted by experts, who advocate the merits of the Chilean system in comparison with the American system. 25/

64. Case-studies and empirical assessments of the performance of the marketing of water rights in Chile, however, appear to indicate that the absence of public interest conditions in the water rights system and its limited regard for externalities may be negatively affecting the performance of water rights markets. A relevant role for markets is not supported by either the number or the magnitude of transactions. Moreover, markets do not seem to have the ability to resolve conflicts within the overall framework of current Chilean water legislation. Conflicts appear either to remain unresolved or to be adjudicated by third parties based on legal, political or economic considerations, rather than being negotiated and contracted according to market rules. This inability of the market to resolve conflicts appears to be particularly evident when dealing with multiple uses and users, large-scale economic issues, basin management and interbasin transfers.

65. Among the factors that impair or block the operation of markets is the absence of incentives to negotiate. For example, public information and data are not widely available to every interested party and the administration. 26/ Also, because water rights are free and are not lost by non-use, there is no incentive to give them up. Even if not currently used, they are a store of future profits at no risk or cost.

66. Additional factors that affect the operation of market mechanisms are:

(a) The absence of adequate infrastructure;

(b) The lack of reliable records and registers;

(c) Traditional approaches that emphasize the security of additional water rather than the profitability of one-at-a-time transactions;

(d) The undervaluation of water rights.

67. Some of the large-scale water conflicts in Chile seem to confirm the view that contractual solutions, such as marketing, do not work well when many parties, large-scale water units and important water-based public services are involved. 27/

68. In the Maule river, clashes between hydro-based and irrigation uses have been frequent. Power companies have not been amenable to the authority of the Maule River Vigilance Committee. Priorities between uses are uncertain. A number of problems have remained unresolved since 1990.

69. In the case of the Bio-Bio river, the water code mechanisms for the coordination of multiple water uses have been found wanting: such results point

to the need to reform the Code's laissez-faire approach. 14/ Problems include issues of basin diversion, pollution, dilution, drinking water supply and sanitation, and irrigation. In this case, the National Water Directorate pointed out that it did not have enough power to control river pollution. In addition, it could not consider issues of water pollution when deciding whether to auction water rights, as required by the Water Code. The courts upheld the position of the Directorate.

70. Attempts are still being made to create private organizations without executive or enforcement powers to solve disagreements through negotiations, but no formal structures have yet been created. 14/

71. In the case of Lake La-Laja and the canal Laja-Diguillín, the conflicts included water diversions, water pollution, scant hydrological data and subsidized agriculture. A decision was taken on the basis of agreements dating back to the 1950s, but arguments have been made that not all basin issues were adequately dealt with. 14/

72. In the case of Pangue, the Supreme Court reversed a previous decision of the Appellate Court of Concepcion, which had ruled against a hydroelectric development on the basis that it would alter the flows of the river, causing sudden water surges. The decision, which would have affected hydroelectric developments throughout the country if maintained by the Supreme Court, was reversed by the latter. The Court argued that future damages, if any, could be compensated at a future time. 14/

73. Water markets did not play a role in any of the cases quoted above. To some extent, the system of unlimited, unconditional water rights within a weak regulatory and administrative framework is criticized as providing a major incentive not to negotiate. Solutions - or better the removal of constraints - have either resulted from general agreements reached before the enactment of the present Code or from court decisions. In some cases, disputes have been left unresolved. According to the Directorate, the system of water rights is a major obstacle to searching for integrated solutions. Technical plans to optimize the use of different water sources for the benefit of all involved parties have been consistently impaired by water rights holders. Not having any kind of public interest constraint in their system of water rights, water rights holders are not interested in negotiations since there is always a legally available alternative for an individual right holder to win the full protection of the law.

74. This assessment indicates that market mechanisms within the cases discussed above may not have been fully operational due to the difficulty of assigning a value to water rights and constraints in the institutional environment.

75. Water transactions other than those involved in large-scale conflict-solving have also been limited. The lack of effective operation of market mechanisms has been attributed to constraints or transaction costs. In addition, the market and the legal system do not exact penalties for the inefficient, inadequate or non-effective use of water rights: water rights are free of charge and there are no sanctions for lack of use. In the western

United States, there is a requirement for effective and beneficial use of water, which is the cornerstone of the system.

76. Accordingly, market incentives for water transactions may not have in fact encouraged efficiency in the use of water. The investments that have taken place may have been prompted by expected gains resulting from the yields of water use. It has been noted that increased investments in irrigation might be due to the creation of subsidies for irrigation development through Law 18, 450/1985. Law 18 authorized subsidies for up to 75 per cent of investments for a period of eight years (art. 1). There have also been considerations on the equity aspects of the system. It has been found that the impact might have been negative, since small and medium-sized farmers did not have adequate information or resources to take full advantage of the system. Low-income farmers did not in fact benefit from the system: if they had rights, they were often lost because the farmers did not know how to protect them; if they did not have water rights, new rights were not obtained because they did not know how to obtain them. 14/ The issue of distribution has also been considered by the World Bank in its First Annual Report on the Environment, in which it is stated that with regard to land, excessive scale and maldistribution are more serious causes of environmental deterioration than misallocation. 28/

IV. CONCLUSIONS

77. In making its recommendations, the Committee may wish to consider the following conclusions drawn by the author from the material presented:

(a) Water markets are a valid means of increasing the efficiency of water use and reallocation;

(b) Systems in which water markets do not exist provide evidence of structural rigidities that negatively affect the efficiency of water allocation, as well as the allocation of other resources;

(c) Areas with a strong tradition and experience in water marketing have established conditionalities to prevent monopolies and protect public and private interest;

(d) Such areas have relatively strong systems of water administration, in which public authorities actively intervene in water use and the assessment of water transactions by means of either administrative, judicial or legislative approval;

(e) In areas in which public interest is lacking, there is no requirement of effective and beneficial use, and regulations and planning are disregarded and discouraged, experience shows that the role of markets has not been as relevant as is assumed by the theoretical justification of the model;

(f) Such areas are already experiencing problems due to the monopolization of water rights and related public services. Conflicts have not been resolved by markets, and the water administration is to a large extent unable to address them;

(g) Water legislation should include water marketing principles, established within a balanced structure in which property protected water rights are accommodated to public interest, including the principle of effective and beneficial use and environmental protection.

Notes

1/ See Livingston, M. L., "Designing water institutions: market failures and institutional responses (Greeley, Colorado). Originally prepared as background to the World Bank Water Policy Paper, 1993.

2/ See Siegfried V. Ciriacy-Wantrup, "Dollars and sense in conservation", Circular 402 (Berkeley: University of California, 1951).

3/ See Código Civil Argentino, art. 2340; Código Civil y Ley de Aguas de Chile, arts. 589 y 590; Ley de Aguas de Ecuador, art. 2; Ley de Aguas de España; and state water laws in the United States of America.

4/ See Jean-Louis Gazzaniga, "Loi Sur L'Eau du 3 Janvier 1992", in Environment, fascicule 610 (Editions Techniques-Juris Classeurs-1993, August 1993); García Montúfar, "Ley de tierras y aguas: fomentando la inversión privada", El Peruano (Lima, 21 June 1995).

5/ Government of India, National Water Policy (New Delhi: Ministry of Water Resources, September 1987).

6/ Under the Lex Coloniae Genetivae Iulae, of 43 A.D., waters in public lands open to colonization were subjected to the same uses and charges existing under previous ownership. See Costa, Le Acque nel Diritto Romano (Bologna, 1918), quoted in Dente Caponera, Principles of Water Law and Administration (Balkema, the Netherlands, 1992).

7/ Thomas P. Z. Mpofu, communication to Ms. Beatrice Labonne (1 August 1995).

8/ See United States Supreme Court, Syllabus and Opinions, No. 80 (1984); Argentinean Supreme Court, La Pampa vs. Mendoza, 1987, L-195-XVIII; Francoise Conac, "Land and water rights issues in irrigated schemes in sub-Saharan Africa: conflicts to be avoided", DVWK Bulletin, No. 16 (Hamburg and Berlin: Verlag Paul Parcy, 1989); and Robert Beck and C. Peter Goplerud III, Waters and Water Rights (Charlottesville, Virginia: The Michie Company, 1991), vol. 1.

9/ See "Detailed decisions of the Council of Australian Governments in relation to water resources policy", document made available by C. G. Gorrie, First Assistant Secretary, Land Resources Division, Commonwealth Department of Primary Industries and Energy, Government of Australia, in a letter of 10 August 1995.

10/ See Robert Beck and C. Peter Goplerud III, op. cit., vol. 2.

11/ See Eduardo Bitran and Raúl Saez, "Privatization and regulation in Chile". Paper presented at a conference on the Chilean economy, 22 and 23 April 1993 (Washington, D.C.: Brookings Institution).

12/ See Lawrence Anthony Sullivan, Antitrust (St. Paul, Minnesota: West Publishing Co., 1977).

13/ See Mark Armstrong and others, Regulatory Reform: Economic Analysis and British Experience (Cambridge, Massachusetts: MIT Press, 1994).

14/ See Carl Bauer, Against the Current: Privatization, Markets, and the State in Water Rights, Chile, 1979-1993 (Berkeley: 1995).

15/ See Barthelemy Otchoun, Cadre Institutionnel and Juridique de Gestion des Ressources en Eau (Government of Benin, 1995).

16/ Pakistan, Five Year Plan, chap. 8 (1993-1998), entitled "Water resources development", document made available by the Ministry of Petroleum and Natural Resources of the Government of Pakistan.

17/ Central Water Commission of the Government of India, "Draft irrigation water management policy" (April 1992).

18/ Government of India, Guidelines for Environmental Impact Assessment of River Valley Projects (New Delhi: Ministry of Environment and Forests, January 1985).

19/ Government of India, Bill No. 39, 1995: The Water (Prevention and Control of Pollution) Cess (Amendment) Bill, 1995.

20/ See Government of China, "Capacity-building on law and institutions for water management", note submitted to the Department for Development Support and Management Services of the United Nations Secretariat on 23 August 1995.

21/ Bonnie G. Colby and others, "Water rights transactions: market values and price dispersion", in Water Resources Research, vol. 29, No. 6 (June 1993).

22/ See Helen M. Ingram and others, "The trust doctrine and community values in water", paper presented at the World Conference on Water Law and Administration, Alicante, Spain, 1989.

23/ See L. Owen Anderson and others, "Reallocation", in Beck and Goplerud, op. cit.

24/ Verbal information provided by Mr. Andrés Benitez, Subdirector de Aguas de Chile.

25/ See Mateen Thobani, in The Economist (2 September 1995); World Bank, "Viewpoint", FDP Note, No. 34 (February 1995); and Mateen Thobani, Tradeable Property Rights to Water.

26/ In fact, a substantial amount of data, as well as much of the information network, has been privatized within the hydroelectrical sector and is no longer available for public consultation (according to verbal information submitted by Mr. Andrés Benitez, Vice-Director, Dirección de Aguas de Chile). Lack of good quality public information is a strong deterrent to agreement on permanent solutions.

27/ Roger Findley and others, Environment Law (St. Paul, Minnesota: West Publishing Co., 1992).

28/ World Bank, The World Bank and the Environment: First Annual Report, 1990 (Washington, D.C.).